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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/608,311	06/30/2000	Xiao-Dong Xiang	6050/54207	9392

7590 06/18/2003

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EXAMINER	
PATEL, PARESH H	
ART UNIT	PAPER NUMBER
2829	

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/608,311	XIANG ET AL.	
	Examiner	Art Unit	
	Paresh Patel	2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-53* is/are pending in the application.

4a) Of the above claim(s) *7-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 February 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *20 February 2003* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

The corrected or substitute drawings were received on 02/20/2003. These drawings are acceptable.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claim 22 is rejected under 35 U.S.C. 102(b) as being anticipated by Wel et al. (Scanning tip microwave near-field microscope).

Regarding claim 22, Wel et al. (hereafter Wel) discloses: A method for measuring electrical impedance [fig. 2] of a sample [sample of fig. 1 and wire of fig. 2] using a probe [probe tip of fig. 1] having a tip, comprising: measuring interaction [see page

3507] between said tip and said sample without contacting [fig. 1] said sample with said tip; and deriving electrical impedance [fig. 2] from said tip-sample interaction.

Claim 22 is rejected under 35 U.S.C. 102(b) as being anticipated by Yalin et al. (Nondestructive Imaging of dielectric-constant profiles and ferroelectric domains with a scanning-tip microwave near-field microscope).

Regarding claim 22, Yalin et al. (hereafter Yalin) discloses: A method for measuring electrical impedance (dielectric constant of a sample) of a sample (sample) using a probe having a tip (a sharpened metal tip), comprising: measuring interaction between said tip and said sample without contacting [see non-destructive, high resolution imaging] said sample with said tip; and deriving electrical impedance [fig. 2-4] from said tip-sample interaction.

Claims 22-53 are rejected under 35 U.S.C. 102(e) as being anticipated by Xiang et al. (US 5821410).

Regarding claim 22, Xiang et al. (hereafter Xiang) discloses: A method for measuring electrical impedance [fig. 10A] of a sample [80] using a probe having a tip [20], comprising: measuring interaction between said tip and said sample [lines 11-28 of column 8] without contacting said sample [see fig. 1 element 20 and 80] with said tip; and deriving electrical impedance [using 176 and 60] from said tip-sample interaction [lines 1-28 of column 8].

Regarding claim 23, Xiang discloses: A method as recited in claim 22, wherein said probe comprises a scanning evanescent microwave probe having a tip extending from a coaxial or transmission line resonator [lines 29-43 of column 8].

Regarding claim 24, Xiang discloses: A method as recited in claim 22, wherein said measurements of electrical impedance are selected from the group consisting essentially of quantitative and qualitative measurements [inherent to 176 and 60].

Regarding claim 25, Xiang discloses: A method as recited in claim 22, wherein said electrical impedance comprises complex dielectric constant and conductivity of said sample [lines 21-34 of column 1].

Regarding claim 26, Xiang discloses: A method as recited in claim 22, wherein said sample comprises a material selected from the group consisting essentially of dielectric insulators, semiconductors, metallic conductors and superconductors [lines 21-34 of column 1].

Regarding claim 27, Xiang discloses: A method as recited in claim 22, wherein said sample comprises a multilayered material [lines 21-34 of column 1].

Regarding claim 28, Xiang discloses: A method as recited in claim 27, wherein said sample comprises a material selected from the group consisting essentially of dielectric insulators, semiconductors, metallic conductors and superconductors [lines 21-34 of column 1].

Regarding claim 29, Xiang discloses: A method as recited in claim 22, wherein said tip-sample interaction is measured with a modulated external field [lines 36-61 of column 7] applied to said sample.

Regarding claim 30, Xiang discloses: A method as recited in claim 29, further comprising detecting the derivatives of the resonant frequency or phase, quality factor or amplitude of said probe with respect to said external field modulation using lock-in

amplifier having an operating frequency coherent with the modulating frequency [lines 36-67 of column 7 also see lines 11-28 of column 8].

Regarding claim 31, Xiang discloses: A method as recited in claim 22, wherein said tip-sample interaction is measured with modulation of tip-sample distance [lines 36-41 of column 7].

Regarding claim 32, Xiang discloses: A method as recited in claim 31, further comprising modulating said tip-sample distance with a piezoelectric nano-positioning device [104 and lines 36-53 of column 7 also lines 16-28 of column 8].

Regarding claim 33, Xiang discloses: A method as recited in claim 31, further comprising: measuring said tip-sample interaction with a lock-in amplifier having an operating frequency coherent with the modulating frequency driving said nano-positioning device [lines 36-52 of column 7].

Regarding claim 34, Xiang discloses: A method as recited in claim 31, further comprising: determining a reference zero point of said tip-sample distance by the maximum amplitude of the derivative of resonant frequency or phase of said probe as said tip approaches the sample surface [inherent to lines 42-44 of column 7 and lines 48-62 of column 5].

Regarding claim 35, Xiang discloses: A method as recited in claim 31, further comprising: determining a reference zero point of said tip-sample distance by the curve fitting of the derivative of resonant frequency or phase of said probe with respect to tip-sample distance modulation as said tip approaches the sample surface [inherent to lines 48-62 of column 5].

Regarding claim 36, Xiang discloses: A method as recited in claim 22, further comprising: determining a physical characteristic of said sample by keeping tip-sample distance constant and calibrating with standard samples [lines 21-62 of column 5 and lines 42-49 of column 7 and lines 39-43 of column 8].

Regarding claim 37, Xiang discloses: A method as recited in claim 22, further comprising: determining a physical characteristic of said sample by keeping resonant frequency constant and calibrating with standard samples [lines 32-63 of column 6 and lines 39-43 of column 8].

Regarding claim 38, Xiang discloses: A method as recited in claim 22, further comprising: keeping the derivative of resonant frequency with respect to tip-sample distance modulation or external field modulation constant; and calibrating with standard samples; wherein a physical characteristic of said sample is determined [lines 39-43 of column 8].

Regarding claim 39, Xiang discloses: A method as recited in claim 22, further comprising: determining a physical characteristic of said sample by curve fitting of resonant frequency or phase of said probe as said tip approaches said sample [inherent to lines 48-52 of column 5].

Regarding claim 40, Xiang discloses: A method as recited in claim 22, further comprising: determining a physical characteristic of said sample by curve fitting of derivatives of resonant frequency or phase of said probe with respect to external modulation field as said tip approaches said sample [inherent to lines 48-52 of column 5].

Regarding claim 41, Xiang discloses: A method as recited in claim 22, further comprising: determining a physical characteristic of said sample by curve fitting of quality factor or amplitude of said probe as said tip approaches said sample [lines 1-7 and lines 49-52 of column 7].

Regarding claim 42, Xiang discloses: A method as recited in claim 22, further comprising: determining a physical characteristic of said sample by curve fitting of derivatives of quality factor or amplitude of said probe with respect to external modulation field as said tip approaches said sample [lines 1-7 and 49-52 of column 7].

Regarding claim 43, Xiang discloses: A method as recited in claim 29, wherein said external field comprises a bias electric field [lines 31-34 of column 2 and lines 59-62 of column 5].

Regarding claim 44, Xiang discloses: A method as recited in claim 36, 37, 38, 39, 40, 41 or 42, further comprising obtaining the nonlinear complex dielectric constant of said sample with electric field modulation [inherent to lines 20-34 of column 1 with lines 31-34 of column 2].

Regarding claim 45, Xiang discloses: A method as recited in claim 29, wherein said external field comprises a magnetic field [lines 57-61 of column 7].

Regarding claim 46, Xiang discloses: A method as recited in claim 36, 37, 38, 39, 40, 41 or 42, further comprising obtaining a physical characteristic of said sample with magnetic field modulation [inherent to lines 20-34 of column 1 with lines 31-34 of column 2].

Regarding claim 47, Xiang discloses: A method as recited in claim 29, wherein said modulated external field comprises optical modulation [lines 25-30 of column 6].

Regarding claim 48, Xiang discloses: A method as recited in claim 47, wherein said optical modulation is achieved by a laser having a characteristic photon energy above the semiconductor sample's carrier excitation energy [inherent to lines 25-30 of column 6].

Regarding claim 49, Xiang discloses: A method as recited in claim 36, 37, 38, 39, 40, 41 or 42, further comprising obtaining a physical characteristic of said sample with optical modulation [lines 25-30 of column 6].

Regarding claim 50, Xiang discloses: A method as recited in claim 49, further comprising obtaining a physical characteristic of said semiconductor selected from the group consisting essentially of photoconductivity, dopant level, junction depth, junction profile, ion implant flux level, and annealing temperature [inherent to "other novel conductivity" at lines 20-34 of column 1].

Regarding claim 51, Xiang discloses: A method as recited in claim 47, wherein said optical modulation is achieved by a laser having a characteristic photon energy in infrared region; and wherein said sample is heated by said laser [inherent to optical microscope NSOM).

Regarding claim 52, Xiang discloses: A method as recited in claim 36, 37, 38, 39, 40, 41 or 42, further comprising obtaining a physical characteristic of said sample with heat modulation [inherent to lines 59-61 of column 5].

Regarding claim 53, Xiang discloses: a method of using a SEM [fig. 1 and 10] to determine electrical properties [lines 22-28 of column 8] of a sample, comprising: measuring interaction between tip and sample [lines 22-28 of column 8] without contacting said sample with said tip [lines 50-61 of column 5]; and determining electrical properties of said sample from said interaction measurement [lines 22-25 of column 8].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paresh Patel whose telephone number is 703-306-5859. The examiner can normally be reached on M-F (8:30 to 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703-308-1233. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Paresh Patel
June 13, 2003